GLOSSARY

Terms in this glossary are defined in accord with customary usage, as presented in the Glossary of Terms used in DOE NEPA Documents, followed as needed by specific usage in the context of this SEIS.

accident
: An unplanned sequence of events that results in undesirable consequences.

acid solution
: A liquid in which an acid compound is mixed with water. As used in this SEIS, it is an aqueous solution containing a low concentration of nitric acid, used to remove or recover salt constituents from organic phase in the solvent extraction process.

actinide
: Any member of the group of elements with atomic numbers from 89 (actinium) to 103 (lawrencium), including uranium and plutonium. All members of this group are radioactive.

adsorption
: The adhesion of a substance to the surface of a solid or solid particle.

alternative
: A major choice or strategy to address the SEIS "Purpose and Need" statement, as opposed to the engineering options available to achieve the goal of an alternative.

antimony
: Metallic element belonging to the nitrogen family (Group Va of the periodic table). The symbol for antimony is Sb; Sb-125 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

applicable or relevant and appropriate requirements (ARARs)
: Requirements, including cleanup standards, standards of control, and other substantive environmental protection requirements and criteria for hazardous substances, as specified under Federal and state law and regulations, that must be met when complying with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

aqueous phase
: Water-based solution of soluble chemical species, generally inorganic salts.

aquifer
: A body of rock or sediment that is capable of transmitting groundwater and yielding usable quantities of water to wells or springs.

as low as reasonably achievable (ALARA)
: A process by which a graded approach is applied to maintaining dose levels to workers and the public, and releases of radioactive materials to the environment at a rate that is as far below applicable limits as is reasonably achievable.

atomic number
: The number of positively charged protons in the nucleus of an atom and the number of electrons on an electrically neutral atom.

average throughput
: Volume of salt solution processed per year as restricted by limitations external to a given facility.

back extraction
: Transfer of extracted constituent in organic phase to secondary aqueous phase in solvent extraction process. As used in this SEIS, this process serves to recover separated radioactive cesium for delivery to DWPF.

backfill
: Material, such as soil or sand, used in refilling an excavation.

background radiation
: Radiation from cosmic sources, naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material), and global fallout as it exists in the environment from the testing of nuclear explosive devices.

batch process
: Process with operations performed on fixed volumes of material requiring specific time period(s) for completion.

benzene
: Toxic, flammable organic liquid containing six carbon and six hydrogen atoms (C_6H_6); major decomposition product of tetraphenylborate.

beyond design basis accident (BDBA)
: An accident with an annual frequency of occurrence between 1 in 1,000,000 and 1 in 10,000,000 (1.0×10^{-6} and 1.0×10^{-7}).

biodiversity
: Pertains to the variety of life (e.g., plants, animals, and other organisms) that inhabits a particular area or region.

biphenyl
: Organic solid consisting of two phenyl groups ($C_{12}H_{10}$); minor decomposition product of tetraphenylborate.

blackwater stream
: Water in coastal plains, creeks, swamps, and/or rivers that has been imparted a dark or black coloration due to dissolution of naturally occurring organic matter from soils and decaying vegetation.

borosilicate
: A form of glass containing silica sand, boric oxide, and soda ash.

borosilicate glass
: Refractory glass waste form with high capacity for immobilization of HLW components; representative composition 10 weight percent B_2O_3, 45 weight percent SiO_2, 10 weight percent Na_2O, 35 weight percent waste oxides.

borrow material
: Material, such as soil or sand, that is removed from one location and used as fill material in another location.

bounding accident
: A hypothetical accident, the calculated consequences of which equal or exceed the consequences of all other potential accidents for a particular activity or facility.

cancer
: The name given to a group of diseases characterized by uncontrolled cellular growth.

canister
: A container (generally stainless steel) into which immobilized radioactive waste is placed and sealed.

capable fault
: In part, a capable fault is one that may have had movement at or near the ground surface at least once within the past 35,000 years, or has had recurring movement within the past 500,000 years. Further definition can be found in 10 CFR 100, Appendix A.

capacity throughput
: Maximum volume of salt solution that a facility is designed to process per year.

carbon
: Nonmetallic chemical element in Group IVa of the periodic table. The symbol for carbon is C; C-14 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

carcinogen
: A radionuclide or nonradiological chemical that has been proven or is suspected to be either a promoter or initiator of cancer in humans or animals.

catalyst
: A substance, usually used in small amounts relative to the reactants, that modifies and increases the rate of a chemical reaction without being consumed or produced by the reaction.

catalytic decomposition
: A chemical reaction in which a compound is broken down into simpler compounds or elements in the presence of a catalyst.

caustic solution
: Alkaline solution containing sodium hydroxide or other light metal hydroxides. SRS HLW solutions are caustic solutions. As used in this SEIS, an aqueous solution containing 3-5 molar concentrations of sodium hydroxide used to convert insoluble aluminum hydroxide in HLW sludge to soluble aluminate form.

cement
: A building material made by grinding calcined limestone and clay (silica, lime, and other mineral oxides) to a fine powder, which can be mixed with water and poured to set as a solid mass or used as an ingredient in making mortar or concrete. As used in this SEIS, an ingredient of saltstone.

centrifugal contactor
: A device used in the Solvent Extraction salt processing alternative to separate cesium from HLW salt solution. Aqueous waste enters the contactor and is mixed with an organic solvent, which extracts the cesium. The two liquids are then separated by centrifugal force in a rapidly rotating inner chamber of the device.

cesium
: Chemical element of Group Ia of the periodic table, the alkali metal group, of which sodium and potassium are also members. The symbol for cesium is Cs; Cs-137, Cs-135, and Cs-134 are the principal radioactive isotopes of this element present in the HLW tanks at SRS.

characterization
: The determination of waste composition and properties (by review of process knowledge, nondestructive examination or assay, or sampling and analysis), generally done for the purpose of determining appropriate storage, treatment, handling, transport, and disposal requirements.

chronic exposure
: A continuous or intermittent exposure of an organism to a stressor (e.g., a toxic substance or ionizing radiation) over an extended period of time or significant fraction (often 10 percent or more) of the life span of the organism. Generally, chronic exposure is considered to produce only effects that can be observed some time following initial exposure. These may include impaired reproduction or growth, genetic effects, and other effects such as cancer, precancerous lesions, benign tumors, cataracts, skin changes, and congenital defects.

clarification
: As used in this SEIS, a process in which small residual volumes of insoluble solids (sludge) are removed from soluble salt solution.

Class A, B, & C low-level waste limits
: Waste classification system in 10 CFR 61.55 that prescribes requirements for disposal of low-level radioactive wastes in accordance with the concentrations of radioactive constituents in the wastes.

Code of Federal Regulations (CFR)
: A document containing the regulations of Federal executive departments and agencies.

collective effective dose equivalent
: The sum of the individual effective dose equivalents received in a given period of time by a specified population from exposure to a specified source of radiation. The units for this are person-rem or person-sievert.

committed dose equivalent
: The committed dose in a particular organ or tissue accumulated in a specified period (e.g., 50 years) after intake of a radionuclide.

committed effective dose equivalent
: The dose value obtained by (1) multiplying the committed dose equivalents for the organs or tissues that are irradiated and the weighting factors applicable to those organs or tissues, and (2) summing all the resulting products. Committed effective dose equivalent is expressed in units of rem.

conceptual design
: The conceptual design phase includes the fundamental decisions that are made regarding the desired chemistry or processing operations to be used, the sequencing of unit operations, the relationship of the process with other operations, and whether batch or continuous processing will be employed. Often, these decisions must be made preliminary to the collection of any engineering data regarding actual process yields, generation of reaction by-products, or the efficacy of any needed separation steps. The conceptual design phase is also used to determine the economic feasibility of a process.

condensate
: Liquid that results from condensing a gas by cooling below its saturation temperature.

condenser-decanter
: As used in this SEIS, a process vessel used to separate benzene distilled from a mixture produced by decomposition of tetraphenylborate precipitate. Benzene and water vapors are cooled to immiscible liquids in the condenser and separated by withdrawal of lighter benzene from the top of the decanter.

confining (unit)
: A rock layer (or stratum) having very low hydraulic conductivity (or permeability) that restricts the movement of groundwater either into or out of adjacent aquifers.

contaminant
: Any gaseous, chemical, or organic material that contaminates (pollutes) air, soil, or water. This term also refers to any hazardous substance that does not occur naturally or that occurs at levels greater than those naturally occurring in the surrounding environment (background).

contamination
: As used in this SEIS, the deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or personnel.

continuous process
: As used in this SEIS, process conducted in a flowing system to promote mixing, rapid reaction, and separation of radioactive constituents within limited times needed to minimize competitive side reactions (decomposition).

countercurrent extraction
: A liquid-liquid extraction process in which the organic and the aqueous process streams in contact flow in opposite directions, progressively concentrating the extracted constituent in one phase while depleting the constituent in the other phase.

crane maintenance area
: Shielded space in a process facility that is provided for inspection and repair of overhead crane mechanisms.

criticality
: The condition in which a system (including materials such as plutonium) is capable of sustaining a nuclear chain reaction.

crossflow filtration
: As used in this SEIS, a process for concentrating precipitate slurry by passing it through a porous metal pipe under pressure to force solution into surrounding pipe.

crystalline
: Being, relating to, or composed of crystals.

crystalline silicotitanate
: Insoluble granular inorganic solid ($Na_4SiO_4 \bullet TiO_2$) ion exchange material. As used in this SEIS, a specially developed material to provide capability for removal of cesium from acid or alkaline solutions containing high sodium and potassium concentrations.

curie (Ci)
: The basic unit used to describe the intensity of radioactivity in a sample of material. A curie is equal to 37 billion disintegrations per second, which is approximately the rate of decay of 1 gram of radium. A curie is also a quantity of any radionuclide that decays at a rate of 37 billion disintegrations per second. A unit of radioactivity equal to 37 billion disintegrations per second (i.e., 37 billion becquerels); also a quantity of any radionuclide or mixture of radionuclides having 1 curie of radioactivity.

decommissioning
: The process of removing a facility from operation, followed by decontamination, entombment, dismantlement, or conversion to another use.

decomposition
: The process by which a compound is broken down into simpler compounds or elements by chemical or physical reactions.

decontamination
: The actions taken to reduce or remove substances that pose a substantial present or potential hazard to human health or the environment, such as radioactive contamination on or in facilities, soil, or equipment. Decontamination processes include washing, chemical action, mechanical cleaning, or other techniques.

decontamination factor
: Ratio of initial specific radioactivity to final specific radioactivity resulting from a separations process.

dedicated area
: Space in a facility set aside and equipped for a specific function, such as tool and equipment decontamination.

Defense Waste Processing Facility (DWPF) melter
: Large ceramic vessel used to incorporate HLW components into molten glass; internally (Joule) heated by electric current flow within the glass melt.

design basis accident (DBA)
: An accident postulated for the purpose of establishing functional and performance requirements for safety structures, systems, and components.

design-basis earthquake
: The maximum-intensity earthquake that might occur along the fault nearest to a structure. Structures are built to withstand a design-basis earthquake.

diluent
: A substance used to dilute. As used in this SEIS, the principal component of organic phase employed to separate constituents from aqueous phase in a solvent extraction process.

diversion boxes
: Specialized containment spaces using removable pipe segments (jumpers) to direct the transfer of process streams; usually underground, constructed of reinforced concrete, and sealed with waterproofing compounds or lined with stainless steel.

DOE Orders
: Requirements internal to the U.S. Department of Energy (DOE) that establish DOE policy and procedures, including those for compliance with applicable laws.

dosage
: The concentration-time profile for exposure to toxicological hazards.

dose (or radiation dose)
: A generic term that means absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, or total effective dose equivalent, as defined elsewhere in this glossary.

dose equivalent
: A measure of radiological dose that correlates with biological effect on a common scale for all types of ionizing radiation. Defined as a quantity equal to the absorbed dose in tissue multiplied by a quality factor (the biological effectiveness of a given type of radiation) and all other necessary modifying factors at the location of interest. The unit of dose equivalent is the rem.

drinking water standards
: Prescribed limits on chemical, biological, and radionuclide concentrations in groundwater sources of drinking water, expressed as maximum contaminant levels (MCLs).

effective dose equivalent (EDE)
: The dose value obtained by multiplying the dose equivalents received by specified tissues or organs by the appropriate weighting factors applicable to the tissues or organs irradiated, and then summing all of the resulting products. It includes the dose from radiation sources internal and external to the body. The effective dose equivalent is expressed in units of rem.

effluent
: A waste stream flowing into the atmosphere, surface water, groundwater, or soil. Most frequently, the term applies to wastes discharged to surface waters.

effluent monitoring
: Sampling or measuring specific liquid or gaseous effluent streams for the presence of pollutants.

elevation
: Vertical cross-section of a facility, showing height requirements for operating areas and process facilities.

elutable ion exchange
: Process in which a chemical species is separated from solution by replacement of a constituent of a solid (resin), then removed from the resin by replacement (elution) with another chemical species in solution.

endemic
: Native to a particular area or region.

environmental restoration
: Cleanup and restoration of sites and decontamination and decommissioning of facilities contaminated with radioactive and/or hazardous substances during past production, accidental releases, or disposal activities.

environmental restoration program
: A DOE subprogram concerned with all aspects of assessment and cleanup of both contaminated facilities in use and of sites that are no longer a part of active operations. Remedial actions, most often concerned with contaminated soil and groundwater, and decontamination and decommissioning are responsibilities of this program.

evaporator
: A facility that mechanically reduces the water contents in tank waste to concentrate the waste and reduce storage space needs.

exposure pathways
: The course a chemical or physical agent takes from the source to the exposed organism. An exposure pathway describes a mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from a release site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium, such as air or water, is also included.

external accident (or initiator)
: An accident that is initiated by manmade energy sources not associated with operation of a given facility. Examples include airplane crashes, induced fires, transportation accidents adjacent to a facility, and so forth.

extractant
: As used in this SEIS, a component of the solvent used in the solvent extraction process to facilitate the removal of radioactive cesium from HLW salt solution.

facility flowrate
: Volume of salt solution processed per unit time under normal operating conditions, as required to meet design performance objectives.

final design
: In the final design phase, the emphasis shifts almost completely from the qualitative aspects of the process to the quantitative. Major process vessels are sized, and initial valve counts are often completed. By the end of this phase, a preliminary piping and instrumentation diagram (P&ID) will typically be complete, and broad considerations of facility site design will have been concluded. Opportunities for major process changes are few at this stage, but preliminary cost estimates (on the order of +/- 30%) and economic analyses can be produced.

fission
: A nuclear transformation that is typically characterized by the splitting of a heavy nucleus into at least two other nuclei, the emission of one or more neutrons, and the release of a relatively large amount of energy. Fission of heavy nuclei can occur spontaneously or be induced by neutron bombardment.

fission products
: Nuclides (fission fragments) formed by the fission of heavy elements, plus the nuclides formed by radioactive decay of the fission fragments.

floodplain
: The level area adjoining a river or stream that is sometimes covered by flood water.

flyash
: Fine particulate material produced by the combustion of a solid fuel, such as coal, and discharged as an airborne emission or recovered as a byproduct for various commercial uses. As used in this SEIS, an ingredient in saltstone to limit water infiltration by decreasing porosity.

frames
: Structural components holding assemblies of centrifugal contactors for installation into a remotely operated shielded process cell.

fresh resin
: Condition of an ion exchange solid (resin) before loading with chemical species to be separated from solution.

geologic repository
: A deep (on the order of 600 meters [1,928 feet] or more) underground mined array of tunnels used for permanent disposal of radioactive waste.

groundwater
: Water occurring beneath the earth's surface in the interstices between soil grains, in fractures, and in porous formations.

grout
: A fluid mixture of cement, flyash, slag, and salt solution that hardens into solid form (saltstone).

grout curing
: Process for bringing freshly placed grout to required strength and quality by maintaining humidity and temperature at specified levels for a given period of time.

habitat
: The sum of environmental conditions in a specific place occupied by animals, plants, and other organisms.

half-life
: The time in which half the atoms of a particular radioactive substance disintegrate to another nuclear form. Measured half-lives vary from millionths of a second to billions of years. Also called physical half-life.

hazard index
: The sum of several hazard quotients for multiple chemicals and/or multiple exposure pathways. A hazard index of greater than 1.0 is indicative of potential adverse health effects. Health effects could be minor temporary effects or fatal, depending on the chemical and amount of exposure.

hazard quotient
: The ratio of an exposure level to a substance to a toxicity reference value selected for risk assessment purposes.

hazardous chemical
: A term defined under the Occupational Safety and Health Act and the Emergency Planning and Community Right-to-Know Act as any chemical that is a physical hazard or a health hazard.

hazardous material
: A substance or material, including a hazardous substance, which has been determined by the U.S. Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.

hazardous substance
: Any substance that, when released to the environment in an uncontrolled or unpermitted fashion, becomes subject to the reporting and possible response provisions of the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

hazardous waste
: A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the Environmental Protection Agency in 40 CFR 261.31 through 40 CFR 261.33. Source, special nuclear material, and by-product material, as defined by the Atomic Energy Act, are specifically excluded from the definition of solid waste.

heavy metals
: Metallic elements with high atomic weights (for example, mercury, chromium, cadmium, arsenic, and lead) that can damage living things at low concentrations and tend to accumulate in the food chain.

HEPA filter (High Efficiency Particulate Air filter)
: Gas filter with fibrous medium that produces a particle removal efficiency greater than 99.97 percent.

high-level waste or high-level radioactive waste (HLW)

Defined by statute (the Nuclear Waste Policy Act) to mean the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products nuclides in sufficient concentrations; and other highly radioactive material that the U.S. Nuclear Regulatory Commission (NRC), consistent with existing law, determines by rule requires permanent isolation. The NRC has not defined "sufficient concentrations" of fission products or identified "other highly radioactive material that requires permanent isolation." The NRC defines HLW to mean irradiated (spent) reactor fuel, as well as liquid waste resulting from the operation of the first cycle solvent extraction system, the concentrated wastes from subsequent extraction cycles in a facility for reprocessing irradiated reactor fuel, and solids into which such liquid wastes have been converted. In this SEIS, "high-level waste" is stored in the F- and H-Area Tank Farms.

HLW components

The HLW from the SRS chemical separations process consists of water soluble salts and insoluble sludges. The sludges settle to the bottom of the HLW tanks. The salt solutions are concentrated by evaporation to reduce their volume, forming a solid saltcake and a concentrated supernatant salt solution in the tanks.

hydrology

The study of water, including groundwater, surface water, and rainfall.

hydrolysis

Decomposition of chemical substance by water. As used in this SEIS, the process by which tetraphenylborate precipitate is catalytically decomposed to benzene and a soluble salt solution of waste constituents that is fed to the DWPF melter.

immobilization

A process (e.g., grouting or vitrification) used to stabilize waste. Stabilizing the waste inhibits the release of waste to the environment.

in situ

A Latin term meaning “in place”.

inadvertent intrusion

The inadvertent disturbance of a disposal facility or its immediate environment by a potential future occupant that could result in loss of containment of the waste or exposure of personnel. Inadvertent intrusion is a significant consideration that shall be included either in the design requirements or waste acceptance criteria of a waste disposal facility.

incineration

Controlled burning of solid or liquid wastes to oxidize the combustible constituents and, especially for liquid wastes, to vaporize water so as to reduce waste volume; in this SEIS, the process used to destroy benzene generated from decomposition of tetraphenylborate precipitate in DWPF.

inhibited water

Water to which sodium hydroxide has been added to inhibit corrosion.

institutional control
: The control of waste disposal sites or other contaminated sites by human institutions in order to prevent or limit exposures to hazardous materials. Institutional control may be accomplished by (1) active control measures, such as employing security guards and maintaining security fences to restrict site access, and (2) passive control measures, such as using physical markers, deed restrictions, government regulations, and public records and archives to preserve knowledge of the site and prevent inappropriate uses.

In-Tank Precipitation (ITP)
: Previously selected process for separation of radioactive cesium and other radioactive constituents from HLW salt solutions by tetraphenylborate precipitation and associated sorption processes, to be replaced by another salt processing alternative that avoids excessive benzene generation.

internal accidents
: Accidents that are initiated by man-made energy sources associated with the operation of a given facility. Examples include process explosions, fires, spills, and criticalities.

involved workers
: Workers who would be involved in a proposed action (as opposed to workers who would be on the site of a proposed action, but not involved in the action).

iodine
: Chemical element of Group VIIa of the periodic table, the halogen group, of which chlorine is a member. The symbol for iodine is I; I-129 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

ion exchange, ion exchange medium (resin)
: The process by which salts present as charged ions in water are attached to active groups on and in an ion exchange resin and other ions are discharged into water allowing separation of the two types of ions. Ion exchange resins can be formulated to remove specific chemicals and radionuclides from the salt solutions in the HLW tanks.

isotope
: One of two or more atoms with the same number of protons, but different numbers of neutrons, in their nuclei. Thus, carbon-12, carbon-13, and carbon-14 are isotopes of the element carbon; the numbers denote the approximate atomic weights. Isotopes have very nearly the same chemical properties, but often have different physical properties (for example, carbon-12 and -13 are stable, while carbon-14 is radioactive).

jumpers
: As used in this SEIS, removable pipe segments used to direct the flow of process streams in transfer operations.

Late Wash Facility
: Assemblage of currently inoperative tanks originally intended for washing soluble corrosion inhibitors from tetraphenylborate precipitate stream from ITP to DWPF. Proposed location of Pilot Plant for selected salt processing alternative.

latent cancer fatality
: Death from cancer resulting from, and occurring some time after, exposure to ionizing radiation or other carcinogens.

layout plan
: Floor plan of facility showing operating areas and typical process equipment.

lifting lug
: Projection on a metal part that serves as handle, support, or fitting connection for attachment of a lifting device.

low-level mixed waste (LLMW)
: Waste that contains both hazardous waste under RCRA and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 USC 2011, et seq.).

low-level waste (LLW)
: Radioactive waste that contains typically small amounts of radioactivity and is not classified as, HLW transuranic waste, spent nuclear fuel or by-product tailings from processing uranium or thorium ore.

low point drain tank
: Intermediate transfer facility for delivery of high-activity salt solution from a tank farm to the Grout Facility in the Direct Disposal in Grout alternative, and transfer of washed MST and sludge solids from the Grout Facility to DWPF.

macroinvertebrate
: Small animal, such as a larval aquatic insect, that is visible to the naked eye and has no vertebral column.

manipulator
: Mechanical device for handling operations inside a radiation-shielded area, controlled manually by hand operations outside the shielded area.

maximally exposed individual (MEI)
: A hypothetical individual whose location and habits result in the highest total radiological or chemical exposure (and thus dose) from a particular source for all exposure routes (e.g., inhalation, ingestion, direct exposure).

millirad
: One thousandth of a rad (see rad).

millirem
: One thousandth of a rem (see rem).

mixed waste
: Waste that contains both hazardous material wastes under RCRA and radioactive source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954.

modifier
: Component of organic phase added to solvent to enhance separation of a specified constituent in the solvent extraction process.

modular confinement
: Containment system consisting of movable, replaceable structural units.

modular shielding
: Shielding components assembled from movable, replaceable units.

modular structure
: Building constructed of pre-assembled or pre-sized units of a standard design.

module
: Self-contained unit that serves as a building block for a structure.

monosodium titanate (MST)
: Water-insoluble inorganic substance ($NaTiO_5H$) used to remove residual actinides (uranium, plutonium) and fission product strontium by sorption from waste salt solutions.

nanocurie
: One billionth of a curie (see curie).

natural grade
: Elevation of a finished surface for an engineering project; ground level.

natural phenomena accidents
: Accidents that are initiated by phenomena such as earthquakes, tornadoes, floods, and so forth.

nitrate
: Any member of a class of compounds derived from nitric acid. The nitrates are ionic compounds containing the negative nitrate ion, NO_3, and a positive ion, such as sodium (Na) in sodium nitrate ($NaNO_3$). Sodium nitrate is a major constituent of the salt component in the HLW tanks.

nitrite
: Any member of a class of compounds derived from nitrous acid. Salts of nitrous acid are ionic compounds containing the negative nitrite ion, NO_2, and a positive ion such as sodium (Na) in sodium nitrite ($NaNO_2$).

nonelutable ion exchange
: Process in which a chemical species is separated from solution by replacement of a constituent of a solid (resin), but is not removed (eluted) from the solid before final disposition.

noninvolved workers
: Workers in a fixed population outside the day-to-day process safety management controls of a given facility area. In practice, this fixed population is normally the workers at an independent facility area located a specific distance (often 100 meters) from the reference facility area.

nuclear criticality
: A self-sustaining nuclear chain reaction.

nuclide
: A general term referring to any one of all known isotopes, both stable (279) and unstable (about 5,000), of the chemical elements.

offsite
: Away from the SRS site.

offsite population
: For facility accident analyses, the collective sum of individuals located within a 50-mile (80-kilometer) radius of a facility and within the path of the plume with the wind blowing in the most populous direction.

onsite
: On the SRS property.

Organic Evaporator
: As used in this SEIS, a process vessel provided to decontaminate benzene recovered from the decomposition of tetraphenylborate precipitate. Benzene is washed with water and separated by distillation.

oxalic acid
: A water-soluble organic acid, $H_2C_2O_4$, being considered as a cleaning agent to use in spray washing of tanks, because it dissolves sludge and is only moderately aggressive against carbon steel, the material used in construction of the waste tanks.

particulate
: Pertains to minute, separate particles. An example of dry particulate is dust.

performance modeling
: A systematic mathematical analysis to estimate potential human exposures to hazardous and radioactive substances. It may include specification of potential releases, exposure pathways, effects of facility degradation, transport in the environment, uptake by the affected recipient, and comparison of estimated exposures to regulatory limits or other established performance.

performance objectives
: Parameters within which a facility must perform to be considered acceptable.

permanent disposal
: For HLW, the term means emplacement in a repository for HLW, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.

permeability
: The degree of ease with which water can pass through rock or soil.

person-rem
: A unit of collective radiation dose applied to populations or groups of individuals; that is, a unit for expressing the dose when summed across all persons in a specified population or group.

pH
: A measure of the relative acidity or alkalinity of a solution. A neutral solution has a pH of 7, acids have a pH of less than 7, and bases have a pH of greater than 7.

picocurie
: One trillionth of a curie (see curie).

plutonium
: Chemical element of the actinide series in Group IIIb of the periodic table. All isotopes of plutonium are radioactive. The symbol for plutonium is Pu.

population
: For risk assessment purposes, population consists of the total potential members of the public or workforce who could be exposed to a possible radiation or chemical dose from an exposure to radionuclides or carcinogenic chemicals.

population dose
: The overall dose to population, consisting of the sum of the doses received by individuals in the population.

Precipitate Hydrolysis
: As used in this SEIS, a chemical process in which tetraphenylborate precipitate is catalytically decomposed to benzene and a soluble salt solution of waste constituents to be fed to the DWPF water.

Precipitate Hydrolysis Aqueous
: As used in this SEIS, the soluble salt solution generated by the precipitate hydrolysis process to be fed to the DWPF melter.

Precipitate Hydrolysis Cell
: As used in this SEIS, a shielded enclosure in the Small Tank Precipitation facility that is equipped for tetraphenylborate precipitate decomposition operations.

Precipitate Reactor
: As used in this SEIS, a process vessel provided for decomposition of tetraphenylborate precipitate by the precipitate hydrolysis process to eliminate benzene.

precipitate washing
: Process in which precipitate solids are washed to remove water-soluble salts and excess sodium tetraphenylborate.

precipitation (chemical)
: The formation of an insoluble solid by chemical or physical reaction of constituent in solution.

preconceptual design
: The preconceptual design phase includes the early articulation of process objectives, selection of process steps, and determination of constraints.

pump pits
: As used in this SEIS, intermediate stations in the waste transfer system equipped with tanks and pumps to maintain the flow of process streams, constructed of reinforced concrete with stainless steel liners for containment of radioactive solutions.

purge system
: A method for replacing atmosphere in a containment vessel by an inert gas to prevent the formation of a flammable or explosive mixture.

rad
: The special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs/gram.

radiation (ionizing radiation)
: Alpha particles, beta particles, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other particles capable of producing ions. Radiation, as it is used here, does not include nonionizing radiation such as radio- or microwaves or visible, infrared, or ultraviolet light.

radiation worker
: A worker who is occupationally exposed to ionizing radiation and receives specialized training and radiation monitoring devices to work in such circumstances.

radioactive
: Describing a property of some elements having isotopes that spontaneously transform into one or more different nuclides, giving off energy in the process.

radioactive waste
: Waste that is managed for its radioactive content.

radioactivity
: The property of unstable nuclei in certain atoms of spontaneously emitting ionizing radiation in the form of subatomic particles or electromagnetic energy during nuclear transformations.. The unit of radioactivity is the curie (or becquerel).

radionuclide/isotope
: A radionuclide is an unstable isotope that undergoes spontaneous transformation, emitting radiation. An isotope is any of two or more variations of an element in which the nuclei have the same number of protons (i.e., the same atomic number), but different numbers of neutrons so that their atomic masses differ. Isotopes of a single element possess almost identical chemical properties, but often different physical properties.

radiolytic decomposition
: A physical process in which a compound is broken down into simpler compounds or elements from the absorption of sufficient radiation energy to break the molecular bonds.

raffinate
: Decontaminated salt solution produced by removal of radionuclides from HLW solution, using the solvent extraction process.

reagent
: A substance used in a chemical reaction to detect, measure, examine, or produce other substances.

Record of Decision (ROD)
: A concise public document that records a Federal agency's decision(s) concerning a proposed action.

reconstituted salt solution
: Waste salt solution obtained by dissolving saltcake in water and combining with supernatant salt solution in HLW tanks.

reducing grout
: A grout formulated to behave as a chemical reducing agent. A chemical reducing agent is a substance that reduces other substances (i.e., decreases their positive charge or valence) by supplying electrons. The purpose of a reducing grout is to provide long-term chemical durability against leaching of the residual waste by water. Reducing grout could be composed primarily of cement, blast furnace slag, masonry sand, and silica fume.

reinforced concrete
: Concrete containing steel bars to increase structural integrity.

rem
: A unit of radiation dose that reflects the ability of different types of radiation to damage human tissues and the susceptibility of different tissues to the damage. Rems are a measure of effective dose equivalent. The dose equivalent in rems equals the absorbed dose in rads multiplied by factors that express the biological effectiveness of the radiation producing it.

remote equipment laydown area
: Shielded space provided in processing facility for temporary placement and storage of equipment used in facility operation.

risk
: Quantitative expression of possible loss that considers both the probability that a hazard causes harm and the consequences of that event.

ruthenium
: Chemical element, one of the platinum metals of Group VIII of the periodic table. The symbol for ruthenium is Ru; Ru-106 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

Safety Analysis Report (SAR)
: A report, prepared in accordance with DOE Orders 5481.1B and 5480.23, that summarizes the hazards associated with the operation of a particular facility and defines minimum safety requirements.

salt
: As used in this SEIS, salt is the soluble component of the radioactive wastes in the HLW tanks. The salt component consists of saltcake and salt supernate containing principally sodium nitrate with radionuclides mainly isotopes of cesium and technetium.

saltcake
: Solid crystalline phase of salt component in HLW tanks remaining after the dewatering of salt solution by evaporation.

salt supernatant
: Concentrated solution of salt components in HLW tanks after dewatering of primary salt solution by evaporation.

saltstone
: Cementitious solid waste form employing blend of cement, flyash, and slag to immobilize low-radioactivity salt solutions for onsite disposal.

saltstone vaults
: Near-surface concrete containment structures that are used for disposal of low-level radioactive waste in the form of saltstone. The vaults serve as forms for poured saltstone.

saturated resin
: Condition of an ion exchange solid (resin) used to separate a chemical species from solution when no additional quantity of the chemical species can be loaded onto the solid.

scrub
: Process stage in a solvent extraction procedure for removing secondary salt constituents from organic phase before recovery of principal constituent.

secondary containment system
: Supplementary means for containment of gases or liquids that leak or escape from primary waste process or storage vessels.

seepline
: An area where subsurface water or groundwater emerges from the earth and slowly flows over land.

segregation
: The process of separating (or keeping separate) individual waste types and/or forms in order to facilitate their cost-effective treatment, storage, and disposal.

seismicity
: The phenomena of earth movements; seismic activity. Seismicity is related to the location, size, and rate of occurrence of earthquakes.

selenium
: Chemical element in the oxygen family (Group VIa) of the periodic table, closely allied in chemical and physical properties with the elements sulfur and tellurium. The symbol for selenium is Se; Se-79 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

slag
: The vitreous material left as a residue by the smelting of metallic ore. As used in this SEIS, a component of saltstone added to reduce release of certain waste constituents (technetium, chromium).

sludge
: Component of HLW consisting of the insoluble solids that have settled at the bottom of the HLW storage tanks. Radionculides present in the sludge include fission products and long-lived actinides.

sodium
: Chemical element of Group Ia of the periodic table, the alkali metal group. The symbol for sodium is Na. Sodium salts are a major constituent of the salt component in the HLW tanks.

sodium tetraphenylborate
: Organic reagent used in tetraphenylborate precipitation process for removal of radioactive cesium from HLW salt solution. Chemical formula for sodium tetraphenylborate is $Na(C_6H_5)_4B$.

solids slurry washing
: As used in this SEIS, dilution of salt solution in contact with solids, followed by filtration to reduce concentration of soluble salts in slurried solids.

solvent
: Substance (usually liquid) capable of dissolving one or more other substances.

solvent extraction
: Process for separation of a constituent from an aqueous solution by transfer to an immiscible organic phase. As used in this SEIS, employed to separate radioactive cesium from HLW salt solution.

sorbent
: A material that sorbs another substance; i.e. that has the capacity or tendency to assimilate the substance by either absorption or adsorption.

sorption
: Assimilation of molecules of one substance by a material in a different phase. Adsorption (sorption on a surface) and absorption (sorption into bulk material) are two types of sorption phenomena.

source material
: (a) Uranium, thorium, or any other material that is determined by the U.S. Nuclear Regulatory Commission pursuant to the provisions of the Atomic Energy Act of 1954, Section 61, to be source material; or (b) ores containing one or more of the foregoing materials, in such concentration as the U.S. Nuclear Regulatory Commission may by regulation determine from time-to-time [Atomic Energy Act 11(z)]. Source material is exempt from regulation under the RCRA.

source term
: The amount of a specific pollutant (e.g., chemical, radionuclide) emitted or discharged to a particular environmental medium (e.g., air, water) from a source or group of sources. It is usually expressed as a rate (e.g., amount per unit time).

spent nuclear fuel
: Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated.

stabilization
: Treatment of waste to protect the environment from contamination. This includes rendering a waste immobile or safe for handling and disposal.

stilling tanks
: Process vessels for holdup of decontaminated salt raffinate and concentrated strip effluent from solvent extraction operations to allow floating and removal of entrained organic phase.

strip effluent
: As used in this SEIS, the aqueous cesium solution resulting from the back extraction of cesium from the organic phase in the Solvent Extraction salt processing alternative.

stripping
: Process operation for recovery of constituents extracted into the organic phase in the solvent extraction operation by contacting the organic phase with a dilute acid stream.

strontium
: Chemical element of Group IIa of the periodic table, the alkaline-earth metal group, of which calcium is a member. The symbol for strontium is Sr; Sr-90 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

subsurface
: The area below the land surface (including the vadose zone and aquifers).

supernatant salt solution
: Saturated solution of salt wastes remaining in waste tanks after dewatering of salt wastes by evaporation.

suppressor
: Component of organic phase added to diluent to promote recovery of constituent extracted into organic phase in solvent extraction operations.

tank farm
: An installation of multiple adjacent tanks, usually interconnected, for storage of liquid radioactive waste.

technetium
: Chemical element, a metal of Group VIIb of the periodic table. All isotopes of technetium are radioactive. The symbol for technetium is Tc; Tc-99 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

tetraphenylborate
: Chemical consisting of four phenyl groups attached to boron atom $(C_6H_5)_4$ B. Sodium tetraphenylborate used to separate radioactive cesium from HLW salt solution by precipitation, forming insoluble cesium tetraphenylborate.

Tetraphenylborate Precipitation
: Process used to separate cesium, potassium, and ammonium constituents from HLW salt solution by formation of insoluble solids. The process is projected for use in the Small Tank Precipitation salt processing alternative.

tin
: Chemical element belonging to the carbon family, Group IVa of the periodic table. The symbol for tin is Sn; Sn-126 is the principal radioactive isotope of this element present in the HLW tanks at SRS.

total effective dose equivalent
: The sum of the external dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

transuranic waste
: Waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes, with half-lives greater than 20 years, per gram of waste, except for (a) HLW; (b) waste that the U.S. Department of Energy has determined, with the concurrence of the Administrator of the U.S. Environmental Protection Agency, does not need the degree of isolation required by 40 CFR 191; or (c) waste that the U.S. Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61.

treatment
: Any activity that alters the chemical or physical nature of a hazardous waste to reduce its toxicity, volume, or mobility or to render it amenable for transport, storage, or disposal.

tritium
: A radioactive isotope of hydrogen whose nucleus contains one proton and two neutrons. The symbol for tritium is H-3. In the HLW tanks at SRS, tritium is usually bound in water molecules, where it replaces one of the ordinary hydrogen atoms.

uranium
: Chemical element of the actinide series in Group IIIb of the periodic table. All isotopes of uranium are radioactive. The symbol for uranium is U.

vadose zone
: The zone between the land surface and the water table. Saturated bodies, such as perched groundwater, may exist in the vadose zone. Also called the zone of aeration and the unsaturated zone.

valve box
: Transfer system component regulating the flow of process streams in a piping system by manual or remote valve adjustment.

vitrification
: As used in this SEIS, a method of immobilizing waste (e.g., radioactive, hazardous, and mixed), by melting glass frit and waste into a solid waste form suitable for long-term storage and disposal.

volatile organic compounds (VOCs)
: Compounds that readily evaporate and vaporize at normal temperatures and pressures.

waste minimization
: An action that economically avoids or reduces the generation of waste by source reduction, reducing the toxicity of hazardous waste, improving energy usage, or recycling.

waste stream
: A waste or group of wastes with similar physical form, radiological properties, U. S. Environmental Protection Agency waste codes, or associated land disposal restriction treatment standards. May result from one or more processes or operations.

wetlands
: Areas that are inundated or saturated by surface water or groundwater and that typically support vegetation adapted for life in saturated soils. Wetlands generally include swamps, marshes, bogs, and similar areas.

wind rose

A circular diagram showing, for a specific location, the percentage of the time the wind is from each compass direction. A wind rose for use in assessing consequences of airborne releases also shows the frequency of different wind speeds for each compass direction.